

CLAIMS

1. Apparatus for imaging of the inner structure of the breast, the apparatus comprising:

5 a source of light illuminating the breast when the source of light is situated at a first position of the breast; and

a detector which when situated at a second position relative to the breast, detects light from said source passing through a portion of the breast from the source;

wherein the source of light comprises either:

10 a non-laser radiant source and at least one optical filter situated between source and the detector that limits the light reaching the detector from the source to a visible spectral band limited to wavelengths in the range from 490 to 510 nanometers or 520 to 580 nanometers; or

a source of laser light operating at an output at between 490 and 510  
15 nanometers or between 520 and 580 nanometers or is a tunable laser light source operating at a wavelength between 490 and 510 nanometers or between 520 and 580 nanometers.

2. Apparatus according to claim 1 wherein the apparatus comprises a non-laser  
20 spectral source of light and an optical filter of the at least one optical filters having a lower pass-band limit of 520 nanometers or more and an upper pass-band limit of 580 nanometers or less.

3. Apparatus according to claim 1 wherein the apparatus comprises a non-laser  
25 spectral source of light and an optical filter of the at least one optical filters having a lower pass-band limit of 490 nanometers or more and an upper band-pass limit of 510 nanometers or less.

4. Apparatus according to claim 1, wherein the source of light is a non-radiant  
30 laser source and including:

a plurality of optical filters;

a filter holder situated between the source and the detector, such that when a filter is placed in said holder light reaching the detector from the source is limited to a

visible spectral band different from that of at least one of the other filters and wherein at least one of the filters transmits in a range outside the red and infra-red; and means for selectively changing the filter in the holder.

5     5.     Apparatus according to claim 1 wherein the source of light comprises an incandescent light source.

6.     Apparatus according to claim 1 wherein the source of light comprises a high intensity discharge light source.

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7.     Apparatus according to claim 1 wherein the source of light comprises a laser source having an output in the visible spectral band excluding red.

8.     Apparatus according to claim 7 wherein the source of laser light has an output at between 490 and 510 nanometers.

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9.     Apparatus according to claim 7 wherein the source of laser light has an output at between 520 and 580 nanometers.

10    10.    Apparatus according to claim 7 wherein the laser source provides a tunable laser output.

11.    Apparatus according to claim 10 wherein the laser is tunable to a wavelength above 620 nanometers.

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12.    Apparatus for obtaining stereotactic images of the interior of a breast, comprising:

at least one source of light illuminating the breast and situated at a first position of the breast;

30       at least one matching interface situated, at a second position, on a surface of the breast, which reduces scatter caused by said surface; and

a pair of spaced imaging detectors that view a portion of the breast through said at least one interface and produce images of said portion;

means for viewing the images such that a stereotactic image is perceived by a viewer.

13. Apparatus according to claim 12 and including an optical arrangement for  
5 focusing each of the detectors on a same region in the interior of the breast.

14. Apparatus according to claim 12 wherein the matching interface comprises a surface of a transparent non-porous material and the breast.

10 15. Apparatus according to claim 12 wherein the imaging detectors are matrix detectors.

16. Apparatus according to claim 12 wherein the imaging detectors comprise video cameras.

15 17. Apparatus according to claim 12 wherein the imaging detectors comprise CCD arrays.

18. Apparatus according to claim 12 wherein the imaging detectors comprise  
20 photographic film.

19. Apparatus according to claim 1 and including a breast cage for supporting the breast during imaging.

25 20. A method of imaging a breast comprising:  
illuminating the breast;  
forming an image of said illumination passing through a portion of the breast;  
and  
limiting the light used for imaging to a visible spectral band excluding red  
30 wherein the visible spectral band is limited to the ranges between 520 and 580  
nanometers and between 490 and 520 nanometers.

21. A method according to claim 20 wherein the visible spectral band is limited to a band having a lower band limit of at least 520 nanometers and an upper band limit of below 580 nanometers.
- 5 22. A method according to claim 20 wherein the visible spectral band is limited to a band having a lower band limit of at least 490 nanometers and an upper band limit of below 510 nanometers.
23. A method according to claim 20 and including:  
10 separately imaging the breast at a plurality of wavelengths or wavelength bands, at least one of which encompasses a range outside the red and infra-red.
24. A method according to claim 23, wherein at least one of the images is generated from light having a wavelength greater than 620 nanometers.
- 15 25. A method according to claim 20 and wherein the wavelengths of light used in producing images such that larger blood vessels are emphasized.
26. A method according to claim 20 and including utilizing wavelengths of light  
20 in producing images such that fine blood vessels are emphasized.
27. A method according to claim 20 and including utilizing wavelengths of light in producing images such that tumor tissue is emphasized.